Space Weather Forecast

Issued on Wednesday, 11 October 2023 at 13:05 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate class flares likely days 1 & 2 (11-12 Oct), a chance of Moderate class flares days 3 & 4 (13-14 Oct). Chance G1/Minor G2/Moderate Geomagnetic Storm intervals days 1 & 2. Slight chance of R1/Minor Solar Radiation Storm throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate, with one moderate-class flare, peaking at 10/1217UTC from the largest region in the northwest. There are currently nine sunspot regions on the visible disc. The aforementioned region in the northwest remains the largest region with considerable magnetic complexity. The other magnetically complex spot resides near south-centre disc. The final notable spot is the new region on the northeast limb. This appears to be a large spot, perhaps with some magnetic complexity, though is difficult to analyse due to its location at present. All other regions appear to be small and relatively simple at present. No Earth-directed coronal mass ejections have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds have persisted at generally slow-ambient conditions. Total interplanetary magnetic field strength was weak throughout. The all important north-south component, Bz, was also weak. Geomagnetic activity has been Quiet (Kp 0-1).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels, with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is likely to continue initially with isolated Moderate class flares. The risk may then reduce from 13 Oct as the large sunspot in the northwest departs the disc, although, returning regions during the period bring a potential further increase risk of M-flares. There is a very slight chance of an isolated X-flare throughout.

Solar Wind / Geomagnetic Activity: A coronal mass ejection (CME) is forecast to arrive at Earth late day 1 (11 Oct), or more likely early day 2 (12 Oct). No further Earth-directed CMEs have been observed. Solar winds are slow. Earth is likely to move into the fast wind from a large coronal hole anytime from early on day 1 (11 Oct), peaking at slightly elevated or elevated speeds. Through day 3 and into day 4 (13-14 Oct) winds are anticipated to gradually ease towards background. Quiet to Unsettled (Kp 0-3) geomagnetic activity is expected initially, this increasing to largely Unsettled to Active (Kp 3-4) through day 1 and into day 2 (11/12 Oct) with a chance of G1/Minor or G2/Moderate storm periods due to a coronal hole high speed stream and/or a combined coronal mass ejection impact. Activity easing to mainly Quiet (Kp 0-2) from Day 3 (13 Oct).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to remain at background levels, but with a slight chance of enhancements

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to R1/Minor Solar Radiation Storm levels if any notable flares occur.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	30	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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